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RUDOLPH J. BUCHEL JR., LAW OFFICE OF
P. O. BOX 702526
DALLAS, TX 75370-2526

EXAMINER	
MISLEH, JUSTIN P	

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/612,125
Filing Date: July 02, 2003
Appellant(s): KUENY, ANDREW WEEKS

Rudolph J. Buchel, Jr.
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed February 21, 2008 appealing from the Office action mailed June 28, 2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,986,267	West	11-1999

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1 – 4, 14 – 16, 23 – 29, and 33 – 50 are rejected under 35 U.S.C. 102(b) as being anticipated by West.

For **Claim 1**, West discloses, as shown in figures 4 and 5 and as stated in column 4 (lines 29 – 67) and column 5 (lines 1 – 3 and 10 – 27), a method for enhancing dynamic range of data read from an imaging sensor [see below for Examiner's interpretation of this portion of the preamble], said imaging sensor (CCD 300) comprising N linear pixel arrays (column 4, lines 3 and 4, indicates a 1340 M rows x 400 N columns CCD 300), each of the N linear arrays (400 N Columns) having M dependently controlled charge coupled pixels (1340 M Rows), each pixel charge coupled, and further being coupled to one of N registers (Horizontal Charge Transfer Register 304), the method comprising:

integrating charge in at least some pixels of the N linear pixel arrays (In at least sections 401, 402, 403, and 404; see figure 4 and column 4, lines 47 – 59);

combining charge from a first dependently controlled region (at least region 401 containing 8 rows are binned in binning row 406; see figure 4) of the N linear pixel arrays of the imaging sensor in the N registers by shifting charge from the first dependently controlled region along each of the N linear pixel arrays to each of the N registers (The binned spectra rows are reads out through horizontal register 304; see column 4, lines 66 and 67), said first dependently controlled region (401) of the N linear pixel arrays having at least one pixel line (8 rows; see column 4, lines 49 – 59, and column 5, lines 1 – 3) and said at least one pixel line of the first dependently controlled region is oriented in generally orthogonal direction to the N linear pixel arrays;

shifting charge from the N registers along a linear path (Again, West teaches that the binned spectra rows are reads out through horizontal register 304; see column 4, lines 66 and 67);

representing charge from at least a portion of the first dependently controlled region of the N linear pixel arrays, shifted out of the N registers, as a corresponding portion of N first dependently controlled region data signals (see column 5, lines 34 – 40);

combining charge from a second dependently controlled region (at least region 402 containing 8 rows are binned in binning row 406; see figure 4) of the N linear pixel arrays in the N registers by shifting charge from said at least one pixel line of the second dependently controlled region along each of the N linear pixel arrays to each of the N registers (The binned spectra rows are reads out through horizontal register 304; see column 4, lines 66 and 67), said first and second dependently controlled region (401 and 402) having at least three pixel lines, and said at least three pixel lines being oriented in generally orthogonal direction to the N linear pixel arrays;

shifting charge from the N registers along a linear path (Again, West teaches that the binned spectra rows are reads out through horizontal register 304; see column 4, lines 66 and 67); and

representing charge from at least a portion of the second dependently controlled region of the N linear pixel arrays, shifted out of the N registers, as a corresponding portion of N second dependently controlled region data signals (see column 5, lines 34 – 40).

The Examiner further notes, CCD spectroscopy of West, as stated in column 3 (lines 30 – 43), provides multiline spectroscopy wherein plural spectra are captured in a large region and binned into a smaller region.

As for **Claim 2**, West discloses, as stated in column 5 (lines 34 – 40), presenting said portion of N first dependently controlled region data signals; and presenting said portion of N second dependently controlled region data signals (West states kinetic spectroscopy may be accomplished by capturing a single spectrum comprising multiple rows in region 302, binning such multiple row spectrum into one or more rows in region 301, and then capturing a subsequent spectrum in region 302. Spectroscopy includes displaying/presenting the captured spectra.).

As for **Claim 3**, West discloses wherein said first portion comprises N first dependently controlled region data signals (4 or 8 rows) and said second portion comprises N second dependently controlled region data signals (also 4 or 8 rows).
West states, since both the light and dark alternating area are eight rows high, the resulting arrangement is two rows of a spectrum comprising four binned rows of spectra and tow rows comprising dark charge.

As for **Claim 4**, West discloses, as stated in columns 4 (lines 47 – 67) and 5 (lines 1 – 4), defining the first dependently controlled region of the N linear pixel arrays of the imaging sensor (300) by designating at least one pixel line (4 or 8 lines) as belonging to the first dependently controlled region (401) of the N linear pixel arrays.

As for **Claim 14**, West discloses two modes for spectroscopy including kinetic and multiline. West discloses, as stated in column 5 (line 64) – column 6 (line 13), programming the

device with the appropriate readout mode, which alters an amount of pixel lines in a region prior to instructing said readout controller (also see column 4, line 47 – column 5, line 4). Hence, West discloses wherein defining the first dependently controlled region (401) of the N linear pixel arrays of the imaging sensor is accomplished during a setup phase of a device incorporating said imaging sensor.

As for **Claim 15**, West discloses two modes for spectroscopy including kinetic and multiline. West discloses, as stated in column 5 (line 64) – column 6 (line 13), programming the device with the appropriate readout mode, which alters an amount of pixel lines in a region prior to instructing said readout controller (also see column 4, line 47 – column 5, line 4). Furthermore, West discloses, in column 4 (line 47) – column 5 (line 4) and in column 5, lines 27 – 40), a four to one binning ratio can be used to compress 320 rows in region 301 into 80 rows in region 302 by an arrangement which bins according to the following algorithm: 5 to 1, 5 to 1, 4 to 1, 4 to 1, 2 to 1, 5 to 1, 5 to 1, 4 to 1, 4 to 1, 2 to 1, repeat, etc. Hence, West discloses wherein defining the first dependently controlled region of the N linear pixel arrays of the imaging sensor is accomplished dynamically, following said integrating charge in at least some pixels of the N linear pixel arrays, and prior to a subsequent integration of charge in at least some pixels of the N linear pixel arrays.

As for **Claim 16**, West discloses two modes for spectroscopy including kinetic and multiline. West discloses, as stated in column 5 (line 64) – column 6 (line 13), programming the device with the appropriate readout mode, which alters an amount of pixel lines in a region prior to instructing said readout controller (also see column 4, line 47 – column 5, line 4). Furthermore, West discloses, in column 4 (line 47) – column 5 (line 4) and in column 5, lines 27

– 40), a four to one binning ratio can be used to compress 320 rows in region 301 into 80 rows in region 302 by an arrangement which bins according to the following algorithm: 5 to 1, 5 to 1, 4 to 1, 4 to 1, 2 to 1, 5 to 1, 5 to 1, 4 to 1, 4 to 1, 2 to 1, repeat, etc. Hence, West discloses wherein defining the first dependently controlled region of the N linear pixel arrays of the imaging sensor is accomplished dynamically, following said integrating charge in at least some pixels of the N linear pixel arrays, and prior to a subsequent integration of charge in at least some pixels of the N linear pixel arrays. Hence, the Examiner considers any region with four rows to be binned as small-amplitude signals and any region with eight rows to be binned as large-amplitude signals.

As for **Claim 23**, the CCD spectroscopy of West, as stated in column 3 (lines 10 – 18 and 30 – 43), provides kinetic spectroscopy wherein a single spectrum occupies multiple rows of elements that are binned to increase sensitivity and also provides multiline spectroscopy wherein plural spectra are captured in a large region and binned into a smaller region. Therefore, while not specifically shown or states, it must be that wherein a corresponding each of said portion of N first dependently controlled region data signals and each of said portion of N second dependently controlled region data signals both correspond to at least one discrete wavelength.

As for **Claim 24**, West discloses, as shown in figures 4 and 5 and as stated in column 4 (line 47) – column 5 (line 3) and column 5 (lines 27 – 40), combining (in CCD region 302; see figure 5) a part of said portion of N first dependently controlled region data signals (401) with a non-corresponding part of said portion of N second dependently controlled region data signals (402); and presenting the part of said portion of N first dependently controlled region data signals and the non-corresponding part of said portion of N second dependently controlled region data signals as a plurality of data signals.

West discloses multiline spectroscopy is provided with a plurality of different spectra. West also discloses kinetic spectroscopy is provided with a single spectrum.

For **Claim 25**, West discloses, as shown in figures 4 and 5 and as stated in column 4 (lines 29 – 67) and column 5 (lines 1 – 3 and 10 – 27), an imaging apparatus (300) comprising an imaging sensor (300) comprising:

N linear pixel arrays (column 4, lines 3 and 4, indicates a 1340 M rows x 400 N columns CCD 300), each of the N linear arrays (400 N Columns) having M dependently controlled charge coupled pixels (1340 M Rows);

M pixel lines (1340), said M pixel lines being oriented in generally orthogonal direction to the N linear pixel arrays;

N registers (304), wherein one pixel in each of the N linear pixel arrays being charge coupled to a respective one of the N registers;

signal converter (amplifier in figures 4 and 5 that corresponds to amplifier 104 in figure 1);

an output node coupled to said signal converter (see output line extending from said signal converter);

a memory connected to said output node (although not specifically shown; a must have feature of the CCD image sensor 300);

a readout controller coupled to said imaging sensor for controlling readout of said M dependently controlled charge coupled pixels in all the N linear pixel arrays (although not specifically shown; a must have feature of the CCD image sensor 300); and

means for instructing said readout controller (see column 6, lines 11 – 13) for combining charge from a first dependently controlled region (at least region 401 containing 8 rows are binned in binning row 406; see figure 4) of the N linear pixel arrays of the imaging sensor in the N registers by shifting charge from the first dependently controlled region along each of the N linear pixel arrays to each of the N registers (The binned spectra rows are reads out through horizontal register 304; see column 4, lines 66 and 67), said first dependently controlled region (401) of the N linear pixel arrays having at least one pixel line (8 rows; see column 4, lines 49 – 59, and column 5, lines 1 – 3) and said at least one pixel line of the first dependently controlled region is oriented in generally orthogonal direction to the N linear pixel arrays; shifting charge from the N registers along a linear path (Again, West teaches that the binned spectra rows are reads out through horizontal register 304; see column 4, lines 66 and 67); combining charge from a second dependently controlled region (at least region 402 containing 8 rows are binned in binning row 406; see figure 4) of the N linear pixel arrays in the N registers by shifting charge from said at least one pixel line of the second dependently controlled region along each of the N linear pixel arrays to each of the N registers (The binned spectra rows are reads out through horizontal register 304; see column 4, lines 66 and 67), said second dependently controlled region (403) having at least one pixel line, and said at least one pixel line of the second dependently controlled region is oriented in generally orthogonal direction to the N linear pixel arrays; shifting charge from the N registers along a linear path (Again, West teaches that the binned spectra rows are reads out through horizontal register 304; see column 4, lines 66 and 67).

The Examiner further notes, CCD spectroscopy of West, as stated in column 3 (lines 30 – 43), provides multiline spectroscopy wherein plural spectra are captured in a large region and binned into a smaller region.

As for **Claim 26**, West discloses wherein said memory being coupled to a display device (although not specifically shown; a must have feature of the spectroscopy system of West)

As for **Claim 27**, West discloses two modes for spectroscopy including kinetic and multiline. West discloses, as stated in column 5 (line 64) – column 6 (line 13), programming the device with the appropriate readout mode, which alters an amount of pixel lines in a region prior to instructing said readout controller (also see column 4, line 47 – column 5, line 4).

For **Claim 28**, West discloses, as shown in figures 4 and 5 and as stated in column 4 (lines 29 – 67) and column 5 (lines 1 – 3 and 10 – 27), a computer program product, comprising a computer-readable medium (see column 6, lines 11 – 13) having stored thereon computer executable instructions for implementing a method for enhancing dynamic range of data read from an imaging sensor [see below for Examiner's interpretation of this portion of the preamble], said imaging sensor (CCD 300) comprising N linear pixel arrays (column 4, lines 3 and 4, indicates a 1340 M rows x 400 N columns CCD 300), each of the N linear arrays (400 N Columns) having M dependently controlled charge coupled pixels (1340 M Rows), each pixel charge coupled, and further being coupled to one of N registers (Horizontal Charge Transfer Register 304), said computer executable instructions comprising:

integrating charge in at least some pixels of the N linear pixel arrays (In at least sections 401, 402, 403, and 404; see figure 4 and column 4, lines 47 – 59);

combining charge from a first dependently controlled region (at least region 401 containing 8 rows are binned in binning row 406; see figure 4) of the N linear pixel arrays of the imaging sensor in the N registers by shifting charge from the first dependently controlled region along each of the N linear pixel arrays to each of the N registers (The binned spectra rows are reads out through horizontal register 304; see column 4, lines 66 and 67), said first dependently controlled region (401) of the N linear pixel arrays having at least one pixel line (8 rows; see column 4, lines 49 – 59, and column 5, lines 1 – 3) and said at least one pixel line of the first dependently controlled region is oriented in generally orthogonal direction to the N linear pixel arrays;

shifting charge from the N registers along a linear path (Again, West teaches that the binned spectra rows are reads out through horizontal register 304; see column 4, lines 66 and 67);

representing charge from at least a portion of the first dependently controlled region of the N linear pixel arrays, shifted out of the N registers, as a corresponding portion of N first dependently controlled region data signals (As stated in column 5, lines 34 – 40, West states kinetic spectroscopy may be accomplished by capturing a single spectrum comprising multiple rows in region 302, binning such multiple row spectrum into one or more rows in region 301, and then capturing a subsequent spectrum in region 302.);

combining charge from a second dependently controlled region (at least region 402 containing 8 rows are binned in binning row 406; see figure 4) of the N linear pixel arrays in the N registers by shifting charge from said at least one pixel line of the second dependently controlled region along each of the N linear pixel arrays to each of the N registers (The binned

spectra rows are reads out through horizontal register 304; see column 4, lines 66 and 67), said second dependently controlled region (403) having at least one pixel line, and

said at least one pixel line of the second dependently controlled region is oriented in generally orthogonal direction to the N linear pixel arrays;

shifting charge from the N registers along a linear path (Again, West teaches that the binned spectra rows are reads out through horizontal register 304; see column 4, lines 66 and 67); and

representing charge from at least a portion of the second dependently controlled region of the N linear pixel arrays, shifted out of the N registers, as a corresponding portion of N second dependently controlled region data signals (As stated in column 5, lines 34 – 40, West states kinetic spectroscopy may be accomplished by capturing a single spectrum comprising multiple rows in region 302, binning such multiple row spectrum into one or more rows in region 301, and then capturing a subsequent spectrum in region 302.).

The Examiner further notes, CCD spectroscopy of West, as stated in column 3 (lines 30 – 43), provides multiline spectroscopy wherein plural spectra are captured in a large region and binned into a smaller region.

As for **Claim 29**, West discloses, as stated in columns 4 (lines 47 – 67) and 5 (lines 1 – 4), defining the first dependently controlled region of the N linear pixel arrays of the imaging sensor (300) by designating at least one pixel line (4 or 8 lines) as belonging to the first dependently controlled region (401) of the N linear pixel arrays.

For **Claim 33**, West discloses, as shown in figures 4 and 5 and as stated in column 4 (lines 29 – 67) and column 5 (lines 1 – 3 and 10 – 27), a method for reading data from an

imaging sensor (300), said imaging sensor (CCD 300) comprising N linear pixel arrays (column 4, lines 3 and 4, indicates a 1340 M rows x 400 N columns CCD 300), each of the N linear arrays (400 N Columns) having M dependently controlled charge coupled pixels (1340 M Rows), each pixel charge coupled, and further being coupled to one of N registers (Horizontal Charge Transfer Register 304), the method comprising:

defining a first dependently controlled region (at least region 401 containing 8 rows are binned in binning row 406; see figure 4) of the N linear pixel arrays of the imaging sensor, said first dependently controlled region (401) of the N linear pixel arrays having at least one pixel line (8 rows; see column 4, lines 49 – 59, and column 5, lines 1 – 3);

defining a second dependently controlled region (at least region 402 containing 8 rows are binned in binning row 406; see figure 4) of the N linear pixel arrays of the imaging sensor, said second dependently controlled region (402) having at least one pixel line, and said first and second dependently controlled regions having at least three pixel lines, and said at least three pixel lines of said first and second dependently controlled regions being oriented in generally orthogonal direction to the N linear pixel arrays (see figure 4);

defining a dark dependently controlled region (at least region 405a containing 8 rows) of the N linear pixel arrays of the imaging sensor, said dark dependently controlled region having a plurality of dependently controlled pixel lines (8 rows; see column 4, lines 47 – 57), said plurality of dependently controlled pixel lines are oriented in generally orthogonal direction to the N linear pixel arrays and said plurality of dependently controlled pixel lines are not exposed to light (see column 4, lines 31 – 34);

receiving a first image (multiline spectroscopy mode) on at least some of the pixels of the first dependently controlled region (401) of the N linear pixel arrays (see column 5, lines 10 – 40);

receiving a second image (multiline spectroscopy mode) on at least some of the pixels of the second dependently controlled region (402) of N linear pixel arrays (again see column 5, lines 10 – 40);

integrating charge in at least some pixels of the first dependently controlled region (401) of the N linear pixel arrays and in the at least some pixels of the second dependently controlled region (402) of the N linear pixel arrays (in at least sections 401, 402, 403, and 404; see figure 4 and column 4, lines 47 – 59);

shifting charge from the at least some pixels of the first and second dependently controlled region (401 and 402) of the N linear pixel arrays along a linear path into said dark dependently controlled region (405a) of the N linear pixel arrays of the imaging sensor (The charges from the second region 402 must be shifted through a dark region 405a to be binned in the single row 406); and

reading out charge from said dark dependently controlled region (405a – 405d), said charge from said dark dependently controlled region having been shifted from each region (401 and 402) defined on the N linear pixel arrays of the imaging sensor (300; see column 5, lines 10 – 40).

The Examiner further notes, CCD spectroscopy of West, as stated in column 3 (lines 30 – 43), provides multiline spectroscopy wherein plural spectra are captured in a large region and binned into a smaller region.

As for **Claim 34**, West discloses combining charge integrated in a region (301) in a region of the N linear pixel arrays of the imaging sensors (300) in the N registers by shifting charge from the dark dependently controlled region (405a – 405d) along each of the N linear pixel arrays in the N registers; shifting charge from the N registers along a linear path; and representing charge from at least a portion of the region (301) of the N linear pixel arrays, shifted out of the N registers, as a corresponding portion of N data signals associated with the region (As stated in column 5, lines 34 – 40, West states kinetic spectroscopy may be accomplished by capturing a single spectrum comprising multiple rows in region 302, binning such multiple row spectrum into one or more rows in region 301, and then capturing a subsequent spectrum in region 302.).

As for **Claim 35**, West discloses, as stated in column 5 (lines 10 – 27 and 63 – 67) and column 6 (lines 1 – 6), shifting charge from the dark dependently controlled region (405a – 405d) of the N linear pixel arrays of the imaging sensor (300) in the N registers; and discarding the charge shifted from the dark dependently controlled region of the N linear pixel arrays of the imaging sensor.

As for **Claim 36**, West discloses, as shown in figure 4, wherein the first dependently controlled region is further defined as a third region (403) and a fourth region (404) of the N linear pixel arrays of the imaging sensor.

As for **Claim 37**, West discloses, as stated in column 5 (lines 34 – 40), presenting said portion of N first dependently controlled region data signals; and presenting said portion of N second dependently controlled region data signals (West states kinetic spectroscopy may be accomplished by capturing a single spectrum comprising multiple rows in region 302, binning

such multiple row spectrum into one or more rows in region 301, and then capturing a subsequent spectrum in region 302. Spectroscopy includes displaying/presenting the captured spectra.).

As for **Claim 38**, West discloses, as stated in column 5 (lines 34 – 40), presenting said portion of N third region data signals; and presenting said portion of N fourth region data signals (West states kinetic spectroscopy may be accomplished by capturing a single spectrum comprising multiple rows in region 302, binning such multiple row spectrum into one or more rows in region 301, and then capturing a subsequent spectrum in region 302. Spectroscopy includes displaying/presenting the captured spectra.).

As for **Claim 39**, West discloses, as stated in column 5 (lines 10 – 40), wherein a sum (binning) of the pixel lines defined in said first dependently controlled region (401), said second dependently controlled region (402) and said dark dependently controlled region (405a – 405d) comprises at least M pixel lines.

As for **Claim 40**, West discloses, as stated in column 5 (lines 20 – 40), wherein said plurality of pixel lines of the dark dependently controlled region (405a – 405d) of the N linear pixel arrays is defined as at least M/2 pixel lines (see "binning ratio").

For **Claim 41**, West discloses, as shown in figures 4 and 5 and as stated in column 4 (lines 29 – 67) and column 5 (lines 1 – 3 and 10 – 27), a method for enhancing dynamic range of data read from an imaging sensor [see below for Examiner's interpretation of this portion of the preamble], said imaging sensor (CCD 300) comprising N linear pixel arrays (column 4, lines 3 and 4, indicates a 1340 M rows x 400 N columns CCD 300), each of the N linear arrays (400 N Columns) having M dependently controlled charge coupled pixels (1340 M Rows), each pixel

charge coupled, and further being coupled to one of N registers (Horizontal Charge Transfer Register 304), the method comprising:

integrating charge in at least some pixels of a first dependently controlled region (401) of the N linear pixel arrays (In at least sections 401, 402, 403, and 404; see figure 4 and column 4, lines 47 – 59) and at least some pixels of a second dependently controlled region (402) of the N linear pixel arrays, said first dependently controlled region (at least region 401 containing 8 rows are binned in binning row 406; see figure 4) of the N linear pixel arrays of the imaging sensor, said first dependently controlled region (401) of the N linear pixel arrays having at least one pixel line (8 rows; see column 4, lines 49 – 59, and column 5, lines 1 – 3) and said at least one pixel line of the first dependently controlled region is oriented in generally orthogonal direction to the N linear pixel arrays; and said second dependently controlled region (at least region 402 containing 8 rows are binned in binning row 406; see figure 4) of the N linear pixel arrays of the imaging sensor, said second dependently controlled region (403) having at least one pixel line, and said at least one pixel line of the second dependently controlled region is oriented in generally orthogonal direction to the N linear pixel arrays;

combining charge from a first dependently controlled region (at least region 401 containing 8 rows are binned in binning row 406; see figure 4) of the N linear pixel arrays of the imaging sensor in the N registers by shifting charge from the first dependently controlled region along each of the N linear pixel arrays to each of the N registers (The binned spectra rows are reads out through horizontal register 304; see column 4, lines 66 and 67), said first dependently controlled region (401) of the N linear pixel arrays having at least one pixel line (8 rows; see column 4, lines 49 – 59, and column 5, lines 1 – 3) and said at least one pixel line of the first

dependently controlled region is oriented in generally orthogonal direction to the N linear pixel arrays;

shifting charge from the at least some pixels of the first (401) and second dependently controlled regions (402) of the N linear pixel arrays along a linear path (Again, West teaches that the binned spectra rows are reads out through horizontal register 304; see column 4, lines 66 and 67) into a dark dependently controlled region (at least region 405a containing 8 rows) of the N linear pixel arrays of the imaging sensor, said dark dependently controlled region having a plurality of pixel lines (8 rows; see column 4, lines 47 – 57), said plurality of pixel lines are oriented in generally orthogonal direction to the N linear pixel arrays and said plurality of pixel lines are not exposed to light (see column 4, lines 31 – 34);

representing charge from at least a portion of the first dependently controlled region of the N linear pixel arrays, shifted out of the N registers, as a corresponding portion of N first dependently controlled region data signals (see column 5, lines 34 – 40);

combining charge from a second dependently controlled region (at least region 402 containing 8 rows are binned in binning row 406; see figure 4) of the N linear pixel arrays in the N registers by shifting charge from said at least one pixel line of the second dependently controlled region along each of the N linear pixel arrays to each of the N registers (The binned spectra rows are reads out through horizontal register 304; see column 4, lines 66 and 67), said second dependently controlled region (403) having at least one pixel line, and

said at least one pixel line of the second dependently controlled region is oriented in generally orthogonal direction to the N linear pixel arrays;

shifting charge from the N registers along a linear path (Again, West teaches that the binned spectra rows are reads out through horizontal register 304; see column 4, lines 66 and 67);

representing charge from at least a portion of the second dependently controlled region of the N linear pixel arrays, shifted out of the N registers, as a corresponding portion of N second dependently controlled region data signals (see column 5, lines 34 – 40);

and clearing charge from the dark dependently controlled region of the N linear pixel arrays of the imaging sensor (column 6, lines 1 – 6).

The Examiner further notes, CCD spectroscopy of West, as stated in column 3 (lines 30 – 43), provides multiline spectroscopy wherein plural spectra are captured in a large region and binned into a smaller region.

As for **Claim 42**, West discloses, as stated in column 5 (lines 34 – 40), presenting said portion of N first dependently controlled region data signals; and presenting said portion of N second dependently controlled region data signals (West states kinetic spectroscopy may be accomplished by capturing a single spectrum comprising multiple rows in region 302, binning such multiple row spectrum into one or more rows in region 301, and then capturing a subsequent spectrum in region 302. Spectroscopy includes displaying/presenting the captured spectra.).

As for **Claim 43**, West discloses wherein said first portion comprises N first dependently controlled region data signals (4 or 8 rows) and said second portion comprises N second dependently controlled region data signals (also 4 or 8 rows).

West states, since both the light and dark alternating area are eight rows high, the resulting arrangement is two rows of a spectrum comprising four binned rows of spectra and tow rows comprising dark charge.

As for **Claim 44**, West discloses integrating charge in at least some pixels of a first dependently controlled region (401) of the N linear pixel arrays (In at least sections 401, 402, 403, and 404; see figure 4 and column 4, lines 47 – 59) and at least some pixels of a second dependently controlled region (402) of the N linear pixel arrays, said first dependently controlled region (at least region 401 containing 8 rows are binned in binning row 406; see figure 4) of the N linear pixel arrays of the imaging sensor, said first dependently controlled region (401) of the N linear pixel arrays having at least one pixel line (8 rows; see column 4, lines 49 – 59, and column 5, lines 1 – 3) and said at least one pixel line of the first dependently controlled region is oriented in generally orthogonal direction to the N linear pixel arrays; and said second dependently controlled region (at least region 402 containing 8 rows are binned in binning row 406; see figure 4) of the N linear pixel arrays of the imaging sensor, said second dependently controlled region (403) having at least one pixel line, and said at least one pixel line of the second dependently controlled region is oriented in generally orthogonal direction to the N linear pixel arrays.

As for **Claim 45**, West discloses, as stated in column 6 (lines 1 – 6), wherein clearing charge from the dark dependently controlled region of the N linear pixel arrays further comprises: shifting charge from the dark dependently controlled region of the N linear pixel arrays of the imaging sensor in the N registers; and discarding the charge shifted from the dark dependently controlled region of the N linear pixel arrays of the imaging sensor.

As for **Claim 46**, West discloses, as stated in column 5 (lines 10 – 40), wherein a sum (binning) of the pixel lines defined in said first dependently controlled region (401), said second dependently controlled region (402) and said dark dependently controlled region (405a – 405d) comprises at least M pixel lines.

As for **Claim 47**, West discloses, as stated in column 5 (lines 20 – 40), wherein said plurality of pixel lines of the dark dependently controlled region (405a – 405d) of the N linear pixel arrays is defined as at least M/2 pixel lines (see "binning ratio").

As for **Claim 48**, West discloses multiline spectroscopy including a plurality of spectra. Furthermore, West discloses, in column 5 (lines 14 - 9) and column 5 (line 56) – column 6 (line 6), wherein said first dependently controlled region (401) of the N linear pixel arrays having a first image (first spectra) projected thereon, and said second dependently controlled region (402) of the N linear pixel arrays having a second image (second spectra) projected thereon.

As for **Claim 49**, West discloses multiline spectroscopy including a plurality of spectra. Furthermore, West discloses, in column 5 (lines 14 - 9) and column 5 (line 56) – column 6 (line 6), wherein said first dependently controlled region (401) of the N linear pixel arrays being exposed to a first light source (first spectra), and said second dependently controlled region (402) of the N linear pixel arrays being exposed to a second light source (second spectra)

As for **Claim 50**, West discloses integrating charge in at least some pixels of a one other region (403 – 404) of the N linear pixel arrays (In at least sections 401, 402, 403, and 404; see figure 4 and column 4, lines 47 – 59), said other region (403 – 404) of the N linear pixel arrays having at least one pixel line (8 rows; see column 4, lines 49 – 59, and column 5, lines 1 – 3) and

said at least one pixel line of the other region is oriented in generally orthogonal direction to the N linear pixel arrays;

shifting charge from the at least some pixels of the other region (403 – 404) of the N linear pixel arrays along a linear path (Again, West teaches that the binned spectra rows are reads out through horizontal register 304; see column 4, lines 66 and 67) into a dark dependently controlled region (at least region 405a containing 8 rows) of the N linear pixel arrays of the imaging sensor,

for each of the at least other region (403 or 404), combining charge in one of the at least one other region (at least region 402 containing 8 rows are binned in binning row 406; see figure 4) of the N linear pixel arrays in the N registers by shifting charge from said at least one pixel line of the dark dependently controlled region along each of the N linear pixel arrays to each of the N registers (The binned spectra rows are reads out through horizontal register 304; see column 4, lines 66 and 67), and

shifting charge from the N registers along a linear path (Again, West teaches that the binned spectra rows are reads out through horizontal register 304; see column 4, lines 66 and 67).

(10) Response to Argument

A. The rejection of claims **1 - 4, 14 - 16 and 23 - 29** under U.S.C. § 102(b) is incorrect.

I. Appellant argues, "Nowhere does West teach or suggest combining any charge whatsoever in a shift register (e.g., horizontal registers 304 or 305) as expressly recited and required by claims 1, 25 and 28. West teaches only to enter charge from a single pixel row into a horizontal register and not to combine charges in the horizontal register … According to West, charge from bands 405a, 405b, 405c and 405d is combined in only one binning operation, and

that binning occurs in pixel row 406 of independently controlled region 302 and not in horizontal registers 304 … West expressly teaches that the charges from multiple rows in independently controlled region 301 are line binned in pixel row 406 of independently controlled region 302 and not in horizontal registers 304. After each binning, the charges in rows of region 302 are shifted by exactly one row toward horizontal registers 304" (see Brief, paragraph spanning pages 15 and 16).

Additionally, Appellant argues, "On paragraph 6 of the Advisory Action mailed February 2, 2007, the Examiner asserts that the portion of the claim language referring to combining charges from a first (or second) dependently controlled region of the N linear pixel arrays of the imaging sensor is 'written broadly enough such that it specifies how the charges are combined with use of the N resisters and not necessarily that the charges must be combined only as they are entered [sic] the N registers ...'"

Finally, Appellant argues, "The Appellant strenuously disagrees with this rejection and urges the Board to immediately overturn this rejection … Initially, the plain meaning of the claim term 'combining charge' expressly requires that charges be combined in the N registers and not merely entered … Furthermore, a rudimentary grammatical analysis of the 'combining' steps indicates that the prepositional phrase 'in the N registers' describes where the charges will be combined … Additionally, if the term 'combining' is to be read as merely 'entering' as the Examiner asserts, only charge from a single pixel row could be transferred into the shift registers (else, entering the charge from more than one row would require that multiple rows of charge be combined in the registers and not merely entered) … Contrary to the Examiner's assertions the present claim language DOES NOT allow for each of the first and second dependently controlled

regions to have only a single row, that is, the charge combined in the N registers originates in a region comprising two or more pixel rows … Hence, the charge is from two or more pixel rows and therefore it must be combined in the N shift registers and not merely transferred into them" (see Brief, last two paragraphs on page 17).

The Examiner respectfully disagrees with Appellant's interpretation of the claim language. The Examiner maintains that the claim language does not necessarily require that the charges must be combined in the N registers, as asserted by Appellant.

The Examiner respectfully submits the claim language is written broadly enough such that it specifies how the charges are combined with the use of the N registers and not necessarily that the charges must be combined only as they are entered/shifted into the N registers. The claim language defines "combining charge" as "shifting charge from the first dependently controlled region along each of the N linear pixel arrays to each of the N registers." This recitation allows for at least two separate scenarios: 1) the charges can be combined in the N linear pixel arrays and then the combined charge rows are subsequently shifted in the N registers and/or 2) the charges can be combined as they are shifted from the N linear pixel arrays into the N registers.

The Examiner respectfully submits West discloses the first scenario – the charges are combined in the N linear pixel arrays and then the combined charge rows are subsequently shifted in the N registers. For instance, West discloses, as described by Appellant above and as agreed upon by the Examiner, that charge from bands 405a, 405b, 405c and 405d is combined in only one binning operation, and that binning occurs in pixel row 406 of region 302 and not in horizontal registers 304. West expressly teaches that the charges from multiple rows in region

301 are line binned in pixel row 406 of region 302 and not in horizontal registers 304. After each binning, the charges in rows of region 302 are shifted by exactly one row toward horizontal registers 304. Thus, West indeed discloses, "combining charge from a [dependently controlled] region of the N linear pixel arrays of the imaging sensor in the N registers by shifting charge from the [dependently controlled] region along each of the N linear pixel arrays to each of the N registers," as claimed.

For these reasons, the Examiner respectfully asks the Boards to maintain the rejection.

II. Appellant's arguments in this section further elaborate upon the arguments introduced in the previous section (see Brief, pages 19 – 22). Because the Examiner has successfully demonstrated the failure of Appellant's arguments in the previous section, Appellant's arguments in this section fail for the same reasons. Again, the Examiner respectfully asks the Board to maintain the rejection.

III. Appellant argues, "With respect to claims 1-4, 14-16 and 23-29, the Examiner has improperly stated new grounds for the rejection in the Advisory Action, and the basis of these new grounds of rejection is improper under 35 USC § 102.

"On paragraph 9- 10 of the Advisory Action mailed February 2, 2007, the Examiner asserts that the portion of the claim language referring to the dependently controlled regions of the N linear pixel arrays is 'written broadly enough such that how exactly the first and second regions are dependently controlled is not specified,' and/or 'are dependently controlled with respect to.'

"Appellant respectfully asserts that this rejection is improper and simply does not form the proper foundation for a rejection under 35 USC § 102, but instead seems more appropriately

as a foundation of a rejection under 35 USC § 112 first and/or second paragraphs. Furthermore, Appellant asserts that the present claim language would be well understood to those of ordinary skill in the relevant technology, who understand the working of a prior art CCD and or a common shift register.

"Additionally, in the Final Office Action mailed on June 28, 2006, the Examiner had no difficulty in understanding the meaning of the claim terms and scope of the offending claim language related to dependently controlled regions, and was able to craft a rejection under section 102(b) over that language. There, the Examiner asserted in paragraph 3 on page 4 that West teaches that 'all of the rows in each respective section (301 and 302) of West are dependently controlled with respect to that section.'

"It is respectfully asserted that the present claim language would be easily understood by those of ordinary skill in the art and give adequate notice of potential infringement. Therefore, the rejection of claims 1, 25 and 28 is improper and should be withdrawn" (see Brief, paragraphs spanning pages 22 and 23).

The Examiner respectfully disagrees with Appellant's position. The Examiner did not introduce a new grounds of rejection in the Advisory Action, as alleged by Appellant. The Examiner, upon request by Appellant, further clarified the Examiner's interpretation of claim language as used the Final Rejection (mailed June 28, 2006).

Appellant requested such clarification by arguing, in the After Final Response (filed December 5, 2006), "The present claims recite first dependently controlled region of the N linear pixel arrays and a second dependently controlled region of the N linear pixel arrays. Since the pixels in the N arrays or the first and second regions are dependently controlled, the pixels of the

first and second regions shift in unison in response to a shift command … it is not immediately clear how the West's special purpose device could function with two dependently controlled regions as is recited in the claims" (see After Final Response, paragraph spanning pages 30 and 31; emphasis added by Examiner).

Since no new grounds of rejection were actually introduced in the Advisory Action and since Appellant has not specifically argued against the claim interpretation further clarified in the Advisory Action, the Examiner respectfully asks the Boards to maintain the rejection.

IV. Appellant argues, "With respect to claims 1 - 4, 14 - 16 and 23 - 29, the prior art cited by the Examiner would be inoperable if used in the manner necessary to meet the present claim limitations … the charges from the rows in region 302 could not be combined in horizontal register 304 without contaminating the spectral charge with dark charge, thereby rendering West's asymmetrical split CCD device inoperable … Because the assertedly anticipating reference does not provide an enabling disclosure of the desired subject matter reference, the Examiner has not met the burden … and it is respectfully urged that the Examiner's rejection of claims 1 - 4, 14 - 16 and 23- 29 should not be sustained." (see Brief, pages 23 – 25).

Neither the Examiner nor Appellant has ever asserted that the charges from the rows in West's region 302 be actually combined inside the horizontal register 304. Thus, Appellant's argument is irrelevant. Again, the Examiner respectfully asks the Boards to maintain the rejection.

B. The rejection of claims **33 - 40** under U.S.C. § 102(b) is incorrect.

I. Appellant again disagrees with the Examiner's interpretation of the claim language. Appellant argues, "Initially, the language of claim 33 places two limitations on the

shifting step, firstly the charge is from 'at least some pixels of the first and second dependently controlled regions' is shifted, and secondly the charge is shifted from the regions 'along a linear path into said dark dependently controlled region of the N linear pixel arrays of the imaging sensor.' The plain meaning of claim 33 is clear and unambiguous. Charge that was integrated in pixel rows of the first dependently controlled region and charge that was integrated in pixel rows of the second dependently controlled region must both be shifted into the dark region. The claim term 'and' places a temporal requirement for handling the charges from the first and second regions, i.e., the charges from both regions must be shifted together. Additionally, the preposition 'into' places a spatial constraint on the charges simultaneously with the temporal constraint, hence, the charges from the first and second regions must be shifted inside the dark region and not merely through it" (see Brief, page 27).

The Examiner respectfully disagrees with Appellant's assessment that the claim requires that the charges from each of the two regions must be in the dark region at the same time. The Examiner respectfully submits no such feature is claimed. At best, the claim language is written broadly enough such that it allows for first shifting charge from a single region through the dark region and then second shifting charge from another single region through the dark region. West discloses, as even admitted by Appellant, that the charges from the first region (401) and the second region (402) must be shifted through a dark region (405a) to be combined in the single row (406). Thus, the Examiner respectfully maintains West sufficiently discloses this limitation.

Appellant additionally argues, "the claims explicitly require that all of the charges resulting from exposure to both the first and second images be shifted into the dark region and not merely some part of the charge as would be the case if the charged were merely transferred

through the dark region. The phrase 'the at least some pixels of the first and second dependently controlled regions of the N linear pixel arrays' finds antecedent basis in 'receiving a first image on at least some pixels of the first dependently controlled region of the N linear pixel arrays,' and 'receiving a second image on at least some pixels of the second dependently controlled region of the N linear pixel arrays.' Therefore, the claim limitation 'at least some pixels of the first and second dependently controlled regions' refers to all of the charge integrated in pixels that the first and second images are projected on. Consequently, the charges from any and all of the pixel lines exposed to the first and second images are shifted into the dark region and not merely some charge from some pixel lines in a region without any relationship to the image. Thus, the present claims positively require that all of the charges resulting from exposure to the first and second images be shifted into the dark region" (see Brief, paragraph spanning pages 27 and 28).

The Examiner respectfully disagrees with Appellant's assessment that the claim requires that all of the charges resulting from exposure to the first and second images be shifted into the dark region. The claim language simply states, "shifting charge from the at least some pixels of the first and second dependently controlled regions of the N linear pixel arrays along a linear path into said dark dependently controlled region" (see Claim 33). While the "shifting charge from the at least some pixels of the first and second … regions" language indeed specifies that the shifted charge must come from the first and second regions; the language does not specify how much charge or, rather, what portion of the charge must come from each region. In no way does the claim require that all charge from either the first or second or both regions must be shifted, as alleged by Appellant. Thus, the Examiner respectfully maintains West sufficiently discloses this limitation.

For these reasons, the Examiner respectfully asks the Boards to maintain the rejection.

C. The rejection of claims **41 - 50** under U.S.C. § 102(b) is incorrect.

I. Appellant argues, "With respect to claims 41 - 50, nowhere does the prior art cited by the Examiner describe 'shifting charge from the at least some pixels of the first and second dependently controlled regions of the N linear pixel arrays along a linear path into said dark dependently controlled region of the N linear pixel arrays of the imaging sensor ...' as recited in claim 41.

"Arguments in support of the allowability of these claim limitations are presented directed above in paragraph VII(B) I" (see Brief, page 30).

The Examiner respectfully disagrees with Appellant's arguments for the same reasons given above in section B (I) of this Answer. Hence, for the same reasons, the Examiner respectfully asks the Boards to maintain the rejection.

II. Appellant argues, "With respect to claims 41 - 50, nowhere does the prior art cited by the Examiner describe 'combining charge integrated in the first dependently controlled region of the N linear pixel arrays of the imaging sensor in the N registers by shifting charge from the dark dependently controlled region along each of the N linear pixel arrays to each of the N registers;' and then 'combining charge integrated in the second dependently controlled region of the N linear pixel arrays of the imaging sensor in the N registers by shifting charge from the dark dependently controlled region along each of the N linear pixel arrays to each of the N registers' as recited in claim 41.

"Attention is directed to paragraph VII(A)I above where arguments in support of the allowability of these claim limitations are presented" (see Brief, paragraph spanning pages 30 and 31).

The Examiner respectfully disagrees with Appellant's arguments for the same reasons given above in section A (I) of this Answer. Hence, for the same reasons, the Examiner respectfully asks the Boards to maintain the rejection.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the Examiner in the Related Appeals and Interferences section of this Examiner's Answer.

Respectfully submitted,

/Justin P. Misleh/

Justin P. Misleh
Examiner, GAU 2622

Conferees:

/Lin Ye/

Lin Ye
Supervisory Patent Examiner, GAU 2622

/david ometz/

David L. Ometz
Supervisory Patent Examiner, GAU 2622